Eur. Phys. J. C (2015) 75:242
DOI 10.1140/epjc/s10052-015-3429-2

THE EUROPEAN PHYSICAL JOURNAL C

Erratum

Erratum to: Dispersive analysis for $\eta \to \gamma\gamma^\star$

C. Hanhart[1,2,3,a], **A. Kupść**[4,5,b], **U.-G. Meißner**[1,2,3,6,7,c], **F. Stollenwerk**[1,8,d], **A. Wirzba**[1,2,3,e]

[1] Institut für Kernphysik (Theorie), Forschungszentrum Jülich, 52425 Jülich, Germany
[2] Institute for Advanced Simulation, Forschungszentrum Jülich, 52425 Jülich, Germany
[3] Jülich Center for Hadron Physics, Forschungszentrum Jülich, 52425 Jülich, Germany
[4] Division of Nuclear Physics, Department of Physics and Astronomy, Uppsala University, Box 516, 75120 Uppsala, Sweden
[5] High Energy Physics Department, National Centre for Nuclear Research, ul. Hoza 69, 00-681 Warsaw, Poland
[6] Helmholtz-Institut für Strahlen- und Kernphysik, Universität Bonn, 53115 Bonn, Germany
[7] Bethe Center for Theoretical Physics, Universität Bonn, 53115 Bonn, Germany
[8] *Present Address*: Institut für Physik, Humboldt-Universität zu Berlin, Newtonstr. 15, 12489 Berlin, Germany

Published online: 3 June 2015

Erratum to: Eur. Phys. J. C (2013) 73:2668
DOI 10.1140/epjc/s10052-013-2668-3

In the published paper there are two errors:

- In extracting the amplitude for $\eta' \to \pi\pi\gamma$ from the data of Ref. [6] a factor $(Q^2)^{1/4}$ was missed.[1] This changed somewhat the functional form. Implications of this are discussed below.
- In the process of typesetting those references which were only cited in the tables had erroneously been dropped. The tables with the repaired references are attached (Tables 1, 2).

To correct the latter error we here append those references which were only cited in the tables (Ref. [44] to Ref. [50]) to the reference list of the original journal publication and cite these references explicitly below. We also include the tables as already published in the original journal version, but with the citations repaired.

To discuss the implications of the former error requires some discussion. The corrected figure is shown in Fig. 1. This new figure is to replace the lower panel of Fig. 1 from the original journal version. The direct comparison shows that the η' data (open dots) are still statistically consistent with the same slope as the η data (filled dots). To quantify this claim we calculated the probability that the solid line, which is fitted to the η data, is the proper description also for the η' data. This probability turned out to be 8 %—a value perfectly acceptable.

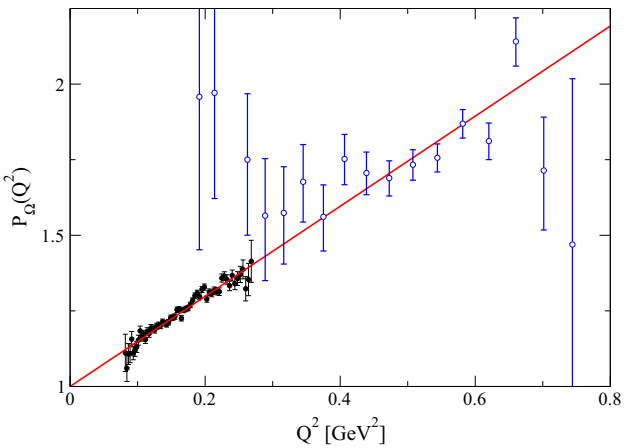


Fig. 1 The function $P_\Omega(Q^2)$ for radiative decays of the η—*solid symbols* (from Ref. [7])—and the η'—*open symbols* (from Ref. [6]). The (*red*) *line* denotes a linear fit to the η data

However, compared to what was used in the original analysis it becomes apparent that the corrected η' data are even better consistent with a non-linear dependence: in fact, a description including also a second order polynomial in Q^2 shows an even higher probability to be correct (27 %).

Since a linear dependence on Q^2 of the η' data is still statistically acceptable, the conclusions of the original publication do not need to be changed. But it should be apparent

[1] We are grateful to Bastian Kubis for pointing out this error to us.

The online version of the original article can be found under doi:10.1140/epjc/s10052-013-2668-3.

[a] e-mail: c.hanhart@fz-juelich.de
[b] e-mail: Andrzej.Kupsc@physics.uu.se
[c] e-mail: meissner@hiskp.uni-bonn.de
[d] e-mail: felix.stollenwerk@physik.hu-berlin.de
[e] e-mail: a.wirzba@fz-juelich.de

Table 1 Comparison of our result for the slope parameter b_η with experimental as well as previous theoretical investigations. The results for the theoretical works (except [33]) are taken from Table II of Ref. [34]. The experimental result $b_\eta = (1.6 \pm 2.0)\,\mathrm{GeV}^{-2}$ of Ref. [35] (for the process $\eta \to e^+e^-\gamma$) is not included because of its large uncertainty

Type	Process	Ref.	$b_\eta\,[\mathrm{GeV}^{-2}]$
Exp.	$\eta \to \mu^+\mu^-\gamma$	[44]	1.90 ± 0.40
Exp.	$e^+e^- \to e^+e^-\gamma\gamma^* \to e^+e^-\eta$	[45]	2.04 ± 0.47
Exp.	$e^+e^- \to e^+e^-\gamma\gamma^* \to e^+e^-\eta$	[36]	1.42 ± 0.20
Exp.	$\eta \to \mu^+\mu^-\gamma$	[46]	1.95 ± 0.17
Exp.	$\eta \to \mu^+\mu^-\gamma$	[31]	1.95 ± 0.07
Exp.	$\eta \to e^+e^-\gamma$	[32]	1.92 ± 0.37
Theory	VMD	[47,48,49]	1.78
Theory	Quark loop	[47,48,49]	1.69
Theory	Brodsky-Lepage	[26]	1.21
Theory	1-loop ChPT	[34]	1.69
Theory	Padé approx. fit to [36,37,38] data	[33]	$1.99 \pm 0.16 \pm 0.11$
Theory	Dispersion integral	This work	$2.05\,^{+0.22}_{-0.10}$

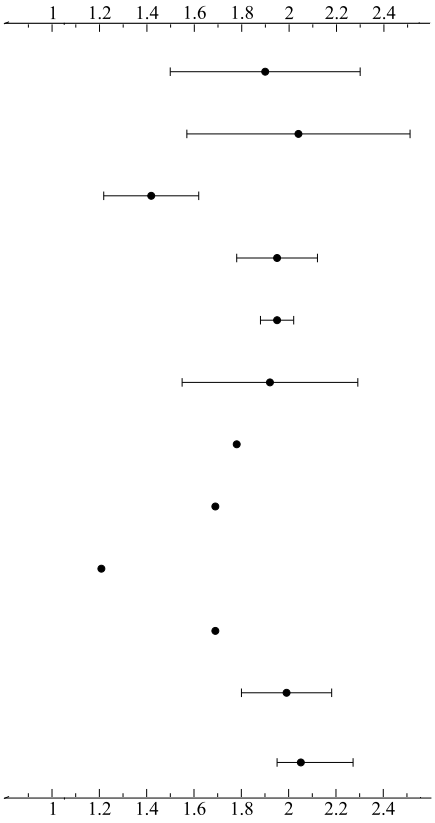
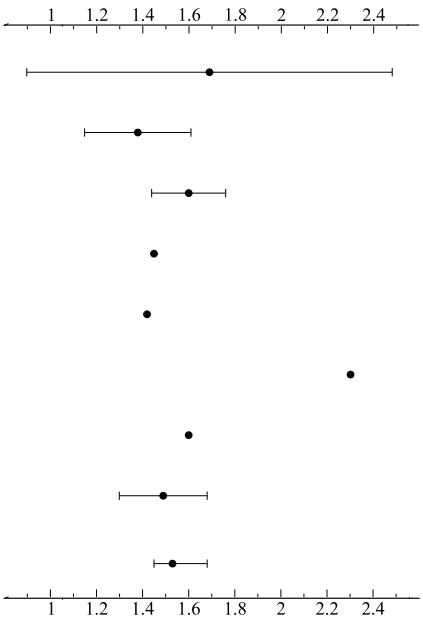


Table 2 Comparison of our result for the slope parameter $b_{\eta'}$ with experimental as well as previous theoretical investigations, under the additional assumption that the parameter α, cf. is the same for both η and η' decays. The results for the various experimental and theoretical works (except [33]) are taken from Ref. [34]

Type	Process	Ref.	$b_{\eta'}\,[\mathrm{GeV}^{-2}]$
Exp.	$\eta' \to \mu^+\mu^-\gamma$	[50,44]	1.69 ± 0.79
Exp.	$e^+e^- \to e^+e^-\gamma\gamma^* \to e^+e^-\eta'$	[45]	1.38 ± 0.23
Exp.	$e^+e^- \to e^+e^-\gamma\gamma^* \to e^+e^-\eta'$	[36]	1.60 ± 0.16
Theory	VMD	[47,48,49]	1.45
Theory	Quark loop	[47,48,49]	1.42
Theory	Brodsky-Lepage	[26]	2.30
Theory	1-loop ChPT	[34]	1.60
Theory	Padé approx. fit to [36,37,38] data	[33]	$1.49 \pm 0.17 \pm 0.09$
Theory	Dispersion integral	This work	$1.53\,^{+0.15}_{-0.08}$



that data of higher quality for $\eta' \to \gamma\pi\pi$ are needed before more definite statements can be made.

References

1. …
⋮
6. A. Abele et al. (Crystal Barrel Collaboration), Phys. Lett. B **402**, 195 (1997)
7. D. Babusci et al. (KLOE/KLOE-2 Collaboration), Phys. Lett. B **718**, 910 (2013). arXiv:1209.4611 [hep-ex]
⋮
26. S.J. Brodsky, G.P. Lepage, Phys. Rev. D **24**, 1808 (1981)
⋮
31. G. Usai (NA60 Collaboration), Nucl. Phys. A **855**, 189 (2011)
32. H. Berghauser, V. Metag, A. Starostin, P. Aguar- Bartolome, L.K. Akasoy, J.R.M. Annand, H.J. Arends, K. Bantawa et al., Phys. Lett. B **701**, 562 (2011)
33. R. Escribano, P. Masjuan, P. Sanchez-Puertas, arXiv:1307.2061v2 [hep-ph]
34. L. Ametller, J. Bijnens, A. Bramon, F. Cornet, Phys. Rev. D **45**, 986 (1992)
35. M.N. Achasov, V.M. Aulchenko, K.I. Beloborodov, A.V. Berdyugin, A.G. Bogdanchikov, A.V. Bozhenok, A.D. Bukin, D.A. Bukin et al., Phys. Lett. B **504**, 275 (2001)
36. H.J. Behrend et al. (CELLO Collaboration), Z. Phys. C **49**, 401 (1991)
37. J. Gronberg et al. (CLEO Collaboration), Phys. Rev. D **57**, 33 (1998). arXiv:hep-ex/9707031
38. P. del Amo Sanchez et al. (BaBar Collaboration), Phys. Rev. D **84**, 052001 (2011). arXiv:1101.1142 [hep-ex]
⋮
44. R.I. Dzhelyadin, S.V. Golovkin, V.A. Kachanov, A.S. Konstantinov, V.F. Konstantinov, V.P. Kubarovsky, A.V. Kulik, L.G. Landsberg et al., Phys. Lett. B **94**, 548 (1980)
45. H. Aihara et al. (TPC/Two Gamma Collaboration), Phys. Rev. Lett. **64**, 172 (1990)
46. R. Arnaldi et al. (NA60 Collaboration), Phys. Lett. B **677**, 260 (2009). arXiv:0902.2547 [hep-ph]
47. A. Bramon, E. Masso, Phys. Lett. B **104**, 311 (1981)
48. L. Ametller, L. Bergstrom, A. Bramon, E. Masso, Nucl. Phys. B **228**, 301 (1983)
49. A. Pich, J. Bernabeu, Z. Phys. C **22**, 197 (1984)
50. R.I. Dzhelyadin, S.V. Golovkin, M.V. Gritsuk, V.A. Kachanov, D.B. Kakauridze, A.S. Konstantinov, V.F. Konstantinov, V.P. Kubarovsky et al., Phys. Lett. B **88**, 379 (1979)